Owy: A Functional Meme Token with a Minimalistic Infrastructure of Inverse Economy

Steven Tofuku
steven@owy.wtf

Arran Shaw
arran@owy.wtf

June 2024

Abstract

Owy is an open-source experimental software that introduces a novel economic model called Inverse Economics, a mirrored version of the current economics, operating with the OWY cryptocurrency. The objective is to explore the effects of this innovative economic design within a decentralized network. Inverse Economics focuses on enhancing the value of each store of value through a unique supply contraction mechanism, creating a hyper-deflationary environment. This approach encourages saving and prudent spending, allowing the economy's value to appreciate over time, driven by decentralized forces. Value distribution through fiscal policy is proportional to all holders, with a focus on prioritizing economic growth over individual returns. Individual contributions to the economy are measured by a time-to-volume weight ratio, ensuring fairness. Owy also offers new possibilities for money design, allowing value extraction and independent control over stored value. By integrating these technical aspects into a meme format, OWY aims to become the world's first functional meme coin. The project is exclusively deployed on the Ethereum blockchain.

1 Introduction

In an inflationary world, as more currency is generated and concentrated among a select few, the value of citizens' money diminishes. Ideally, if newly created money were distributed proportionally among all existing money holders, it would help mitigate these effects. However, this is rarely achieved [1, 2]. To transition sustainably to a deflationary economy, it is crucial that the reduction in the money supply is managed proportionately and fairly.

Strategies effective in an inflationary economy may not be suitable under deflationary conditions and could even backfire. In a deflationary context, where saved money appreciates, individuals are motivated to spend more strategically. Taking on debt also becomes riskier as loans become costlier to repay. As a result, saving gains importance, encouraging people to prioritize long-term financial gains rather than immediate consumption. This shift naturally filters out short-term, inefficient investments.

The project aims to demonstrate that even in a hyper-deflationary scenario, an economy can avoid under-consumption due to the essential consumption needs and the consistent capital gain of stored value. However, a well–designed economic incentivization program can further boost economic activity and speed up the overall maturation of the economy. To implement these principles and drive adoption, the Ethereum

blockchain has been identified as a network for this experiment. The success of the project will depend on how the market responds.

2 Inverse economics

Inverse economics is defined as the economics of value. In this model, value is represented as a product of two factors: time and productivity. By simplifying their relationship through multiplication, we can determine a fair weight that reflects the total value an individual has produced or acquired.

$$value = time \times productivity$$

In reality, it is not possible for individuals to make payments directly with their values; a placeholder, such as money, is required to store and represent this value. Below, we will discuss the attribute of the store of value within the context of Inverse Economics.

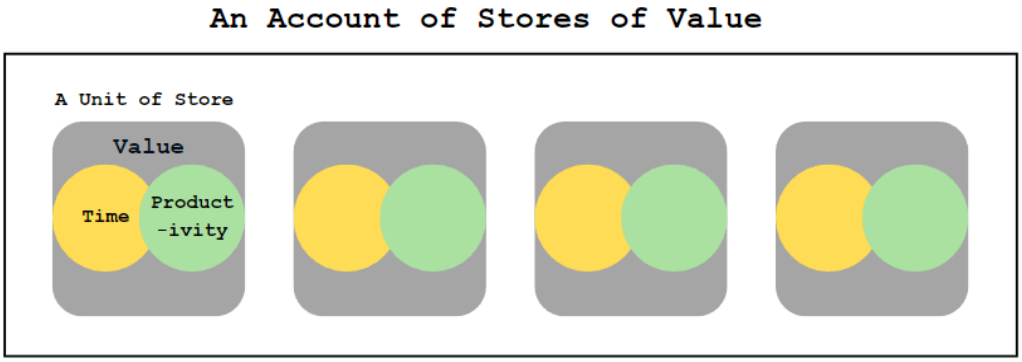

Figure 1. Stores of Value Overview

Figure 1 illustrates value accounting in Inverse Economics. The graphic visually represents the interaction between these values, indicating that the total value in the economy is derived from the average value contained in a store, multiplied by the total supply of stores. The total value also represents the overall value of the economy.

$$value_{total} = value_{average} \times store_{total}$$

To achieve the goals of Inverse Economics, four key concepts are revised: Supply Distribution and Management, Tax and Incentivization, Decentralization and Dependency, and Final Supply. These revisions are designed to create a more sustainable and equitable economic model. Supply Distribution and Management ensure a fair and proportional reduction in the money supply. Tax and Incentivization encourage efficient spending and saving behaviors through strategic rewards. Decentralization and Dependency work to minimize reliance on centralized systems while fostering a mutually beneficial relationship among participants. Finally, Final Supply defines the ultimate limit on economic resources.

2.1 Supply distribution and management

To illustrate these concepts, let's examine USD, Gold, and Bitcoin—each representing different approaches within inflationary economies, where the emission of asset supply is used as an economic incentivization strategy, but with varying management methodologies. USD and Gold both have unknown maximum supply limits, though Gold's scarcity is inherently greater due to physical limitations and mining difficulties. In contrast, Bitcoin operates under a finite supply rule with a deterministic inflation rate, governed by the "halving rule" [3]. Unlike the USD, which is regulated by central authorities, Bitcoin's supply is controlled in a decentralized manner. Numerous anonymous miners compete to earn fractions of network accounting fees and newly minted Bitcoin tokens, known as the subsidy.

In Inverse Economics, we start with a fixed maximum supply of tokens, ensuring no post-deployment emission and preventing devaluation through monetary policy. The supply is actively managed to decrease based on transaction values. Participants can influence the token's deflation and scarcity through their spending behavior. The remaining supply at any given time reflects the "maturity" of the inverse economy, which progresses through stages until it reaches its maximum value growth. Each transaction contributes to this deflationary mechanism by deducting and burning a small fraction of the transfer value as a tax, permanently reducing the total supply. This mechanism, detailed further in Section 2.2 on the Tax System, leads to an increase in the relative value of the remaining tokens for savers, enhancing the value of each unit held.

2.2 Tax and incentivization

Taxation is determined on a pro-rata basis relative to transaction values. When a participant engages in a transaction, a fraction of the transfer value is deducted and permanently burned from the system. This mechanism ensures that the tax collected from transactions is distributed among all existing holders, preventing the funds from re-entering circulation and avoiding any resemblance to a Ponzi scheme.

Spenders, in Inverse Economics, are the transaction initiators who incur value loss through taxation. Conversely, *savers* hold their funds and only encounter taxation if they engage in transactions. Both Saving and spending are essential forms of economic contribution. In an inverse economy, the volume of transactions is generally lower compared to traditional inflationary economies due to high opportunity costs, as the value of money consistently increases. Therefore, encouraging spending is crucial. Rewards for spenders may include tax incentives, discounts, or investment options to compensate them for their role in maintaining the economic framework. Given the value of these rewards, pursuing them can be a rational choice due to arbitrage opportunities. Additionally, in a business context, the *taxpayer* for a transaction can be any external account rather than the spender themselves, providing flexibility in managing transaction costs.

Tax payment incentives (spending incentives) result in different final transaction values for each individual, reflecting their respective contribution level and economic status, akin to measuring the value (time and productivity) each individual has generated. For example, if two individuals each start with 1,900 but one incurs a tax of 200 tokens while the other is taxed only 50 tokens, the latter retains 150 more tokens. This reflects a larger tax discount and higher effective stored value. Despite starting with the same amount, the individual with the lower tax burden ends up with a greater proportion of their original value. Thus, tax discounts illustrate the varying levels of contribution among participants. A higher contribution leads to a higher transactional value within one's reserves. After completing a transaction, individuals receive rewards for their economic input, which should be leveraged to generate additional value in the future

Careful structuring of incentives linked to taxation can transform tax payments into a competitive and strategic activity. When the rewards for paying taxes align with the goals of enhancing individual and collective economic value, participants are more likely to be motivated to contribute through taxes. This approach constructs a healthier economic environment where paying taxes is viewed not as a burden but as an investment in enhancing one's economic position with valuable future returns. In systems employing Inverse Economics, tax payment incentives extend beyond mere tax discounts. However, customization requires comprehensive consideration to keep the system neutral to all participant groups while prioritizing the growth of the economy rather than individual capital returns [2]. This reorientation of fiscal policy encourages individuals to reconsider their asset management strategies. When managed effectively, these financial options can yield significant benefits that surpass those of mere savings.

In this paper, we will showcase the tax incentive structure in the Owy ecosystem in Section 4.2 Tax Incentive.

2.3 Dependency and decentralization

Both saving and tax-paying functions mirror the dynamics of Bitcoin mining, but from a different perspective. While Bitcoin miners compete to secure "amount shares" of newly minted tokens until the upper supply limit is reached, participants in Inverse Economics strive to obtain "value shares" from the tokens that are burnt through transactions. This creates a mutualistic relationship between spenders and savers: savers benefit from value generated by tax payments, while spenders leverage the liquidity provided by savers and earn rewards for tax compensation, which can later be sold or lent for profits. In this system, spenders contribute to the economy by paying taxes, thereby circulating productivity, whereas savers contribute by holding their assets over time, enduring potential price volatility and opportunity costs.

The system advocates for open competition among participants within the economy. An individual's status and privileges should be determined solely by metrics within the economic circle, ensuring that the average value or standard for each objective reflects the participation of the majority. For example, in a saving time competition, incentives should not be based on the absolute amount of time saved but on how much an individual's saving time exceeds the average saving time of all participants. This ensures that economic competition and incentivization remain fair, challenging, and dynamic over time. If most participants save more during a period, spending at that time could lead to greater opportunity losses. In this economic model, the pace of qualitative economic growth is directly tied to the rate of value accumulation through taxation. Unlike the fixed inflation rate in Bitcoin, the inverse economic system dynamically adjusts the pace and extent of supply reduction based on the total taxes collected from all participants. As tax contributions increase, the entire economy experiences faster value appreciation.

Decentralization of economic power is achieved justly when influence and impact are based on value-weighted contributions. An individual's economic status is defined not just by their absolute value, but by their proportion relative to the total available supply. The larger their share, the greater their influence on the economy's trajectory. This approach underscores that to accurately measure anyone's wealth, the total supply of the measuring unit must be finite. For an individual to gain significant economic power, they must contribute substantially to the overall economic value through savings and tax payments. This strategy requires significant sacrifice, making it prohibitively expensive for any single entity to dominate. This system modifies economic competition by emphasizing saving rather than mining, making participation more accessible by eliminating high entry costs. However, steadfast belief and patience are required for individuals to secure a place within this final supply.

2.4 Final supply

Bitcoin clarified the concept of final supply. The limit of twenty-one million not only represents the maximum quantity but also signifies the endpoint for the network's extra incentivization (subsidy), which is intended to kickstart the economy. This approach ensures that all contributors to network protection are sufficiently incentivized until the network gains traction, reputation, and the power to sustain itself when fully mature. The clarity of this number plays a crucial psychological role for participants, providing a clear understanding of total availability and aligning individual aspirations toward predictable profitability and economic status.

Inverse Economics adopts a similar approach by setting a final supply. The deflation continues until the supply reaches a predetermined lower limit, at which point all deflation mechanisms are halted to stabilize the remaining tokens as a final supply. This concept parallels Bitcoin's upper supply limit but operates inversely. While Bitcoin and Gold see competition to produce and accumulate more assets until their upper supply limit is reached, in the inverse economy, participants compete to save and retain value against supply contraction, each aiming for a larger share of the increasingly valuable pie until no further tokens can be burnt (lower supply limit). Along the way to the final supply, there are investment opportunities given to all those who contribute to deflation. In this model, where the supply is finite, the quantity of tax collected is inherently limited. This setup caps the total availability of contribution rewards, influencing participant behavior and the overall dynamics of the economic system.

3 Supply contraction mechanism

Owy is the first project that applies the principles of Inverse Economics to its tokenomics. It begins by distributing its maximum supply of 69 million. Its algorithm then executes a supply contraction to gradually decrease the current total supply. This process will continue until only 69 or fewer OWY tokens remain. At that point, reduction will permanently cease and the token will become supply-stable, like regular ERC20 tokens [4].

3.1 Taxation formula

All participants rely on the same standard of tax calculation formula, as follows:

$$Tax = [TransferValue \times Deflation\,Rate] \times \left[\frac{BlockIn^3}{VWAB^3}\right] \times \left[\frac{Tax\,Accumulation_{individual}}{TaxAccumulation_{total}}\right] \times 1.69$$

The formula can be broken down into three main components for clarity: base value, discounts (by time and by individual tax accumulation), and a magic number. Each of these variables plays a crucial role in determining the overall value. The following sections will elaborate on each component to provide a better understanding of their functionality.

3.1.1 Base tax value

$$TransferValue \times Deflation\,Rate$$

Start with the base value. The $TansferValue$ is the number of Owy tokens that the sender intends to transact. The $Deflation\,Rate$ is the supply contraction rate applied when the transaction occurs. This rate can vary based on the maturity stages determined by the current total supply, as mentioned in the last

paragraph of Section 2.1. Please refer to the Deflation Rate Schedule below for specific rates. Note that the numbers provided may not be entirely accurate due to the limitations of calculation precision in different programs.

Total Supply (TS)	Deflation Rate
$47,610,000.00 \leq TS \leq 69,000,000.00$	6.9000%
$32,850,900.00 \leq TS < 47,610,000.00$	4.7610%
$22,667,121.00 \leq TS < 32,850,900.00$	3.2851%
$15,640,313.49 \leq TS < 22,667,121.00$	2.2667%
$10,791,816.31 \leq TS < 15,640,313.49$	1.5640%
$7,446,353.25 \leq TS < 10,791,816.31$	1.0792%
$5,137,983.74 \leq TS < 7,446,353.25$	0.7446%
$3,545,208.78 \leq TS < 5,137,983.74$	0.5138%
$2,446,194.06 \leq TS < 3,545,208.78$	0.3545%
$1,687,873.90 \leq TS < 2,446,194.06$	0.2446%
$1,164,632.99 \leq TS < 1,687,873.90$	0.1688%
$803,596.76 \leq TS < 1,164,632.99$	0.1165%
$554,481.77 \leq TS < 803,596.76$	0.0804%
$69 < TS < 554,481.77$	0.0690%
$TS \leq 69.00$	0.0000%

Table 1. Deflation Rate Schedule

3.1.2 Discount section

The tax discount is a key factor that determines the value of an individual's OWY tokens. Think of a bottle of water as a store, and the water inside as the value. The maximum capacity of the bottle represents the maximum value of OWY when it reaches the final supply in the future. Discounts take effect by increasing the final value of each bottle when they are utilized (transferred).

In this analogy, while all bottles (OWY tokens) are the same in terms of being containers (fungibility), the amount of water (intrinsic value) they hold can differ based on the discounts applied. This mechanism defines the intrinsic value held by one's OWY tokens, which is represented as the final value during transactions.

- ***Time accumulation***

After we get the base value, if applicable, we will calculate by-time tax discounts for the value sender.

$$\frac{BlockIn^3}{VWAB^3}$$

$BlockIn$ is the volume-weighted Ethereum block number that OWY tokens have been acquired by an individual. For example, a person for the first time obtains 100 OWY at the block number of 450,000. On the next day, he/she purchases 30 more OWY at block number 455600, making his/her new $BlockIn$ be $[\frac{100(450000)+30(455600)}{100+30}]$ = 451,292. In short, all the OWY obtained by an individual has a volume-weighted effect on adjusting their $BlockIn$.

$VWAB$, stands for Volume-Weight Average Block, is the average of all holders' $BlockIn$, calculated as follows:

$$VWAB = \frac{\sum_{i=1}^{n}(BlockIn_i \times Balance_i)}{\sum_{i=1}^{n} Balance_i} = \frac{\sum_{i=1}^{n}(BlockIn_i \times Balance_i)}{Total\ Supply}$$

Since $VWAB$ is updated and increases with almost every transaction of OWY, holders who enter at any stage and save for an adequate duration are guaranteed to receive the discount. This is because $VWAB$ will eventually surpass their $BlockIn$ as long as there are transactions being made. The characteristic of the power of three creates an aggressively exponential effect, meaning that the more time the holders have saved, the more rapidly their discounts grow. However, in the case of the sender having $BlockIn > VWAB$, this calculation would result in a premium tax. To prevent excessive tax amounts, Owy provides the maximum tax limit. For more details, please refer to Section 3.1.2 Magic number and 3.2 Maximum tax.

- ***Tax accumulation***

The discount from this chunk of formulation represents the accumulating amount of tax an individual has been paid, adding to the main formula as below:

$$\frac{Tax\ Accumulation_{individual}}{TaxAccumulation_{total}}$$

$TaxAccumulation$ is the amount of OWY an individual has paid as tax. This variable is divided by the $Total\ TaxAccumulation$, which is the total amount of tax paid by all holders since the beginning. When an individual completes the transaction and pays tax, the amount of tax paid is recorded to their account and added to the $Total\ TaxAccumulation$. If the sender's $TaxAccumulation$ is equal to zero, meaning they have never paid tax, this calculation is then skipped.

3.1.3 Magic number

To enhance the effect of supply contraction, Owy applies a special adjustment to the formula only for senders whose $BlockIn$ is greater than $VWAB$. This adjustment increases the tax amount by 69% compared to the standard formula. If the BlockIn is less than or equal to the VWAB, this adjustment is not applied, and the variable is canceled.

$$1.69$$

Now that the main formula is completed, Owy acknowledges that it might be a bit harsh. To address this, he introduced a ceiling tax value.

3.2 Maximum tax

$$Maximum\,Tax = TransferValue \times Deflation\,Rate \times 1.69$$

The ceiling or maximum tax value for each transaction is set at 69% above the base tax value. Regardless of the tax amount calculated using the main formula, if it exceeds this ceiling value, the user will only be charged the ceiling amount.

4 Contribution incentivization

Considering Section 2, which emphasized the importance of saving and tax paying, especially in their equivalent role to BTC mining, it is crucial to clarify and ensure fair incentives to each group of participants. Incentives for saving and tax paying are calculated separately based on different factors.

4.1 Saving incentive

Savers are the group that directly benefits from the tax payment activities as the value of burnt OWY is proportionally distributed among all existing OWY tokens, resulting in a capital gain for those remaining. This process is the primary incentive for saving within the system. The growth of value for savers relies exclusively on the amount of tax collected over a period of time, which reflects the transaction volume of OWY during that period.

The second incentive for savers can be comprehended as a time accumulation tax discount as detailed in the taxation formula. Since the average entry block number for OWY tokens varies among individuals, each holder receives a unique degree of incentives. . However, there is a relationship between an individual's average accumulation time and the global average. This setup transforms saving into a competitive field among existing holders, with the global average acting as a benchmark for measuring the intensity of each participant's saving efforts.

4.2 Tax incentive

Taxpayers are participants who contribute financially to leverage overall economic value. They are incentivized through their $TaxAccumulation$ record, which plays a crucial role in valuing OWY tokens across all denominations. This cumulative record is integral to the taxation formula, providing a fast-track method for reducing transaction tax. It is calculated based on the $Total\,TaxAccumulation$. If an individual has contributed a substantial portion of the total tax collected, they can quickly gain tax

privileges for future transactions without needing extensive savings. Unlike time-based discounts, $TaxAccumulation$ is reusable.

The availability of tax incentives is closely tied to the supply of OWY tokens, which is constrained by the remaining amount of OWY tokens until the lower supply limit is reached. However, the privileges associated with $Total\ TaxAccumulation$ may diminish as it inflates. To address this, Section 6.2 proposes a significant benefit enhancement of $TaxAccumulation$ to its reusable property. The discussion introduces a new utility token exclusively for taxpayers, aiming to maximize advantages for their contribution to the economy.

5 Transaction options

To enhance the practicality of this economic model, the system provides participants with the ability to configure transactions according to their strategic preferences.

5.1 Liquefaction

Imagine a scenario where the recipient of a transaction is in need to spend the received fund immediately or in the very near future. By default, the recipient will derive OWY tokens with their $BlockIn$ value set to the current Ethereum block number. If these tokens are then immediately used in a transaction, they will not benefit from any time-based tax discount, making it not effectively liquid. Liquefaction is the method designed to mitigate this issue.

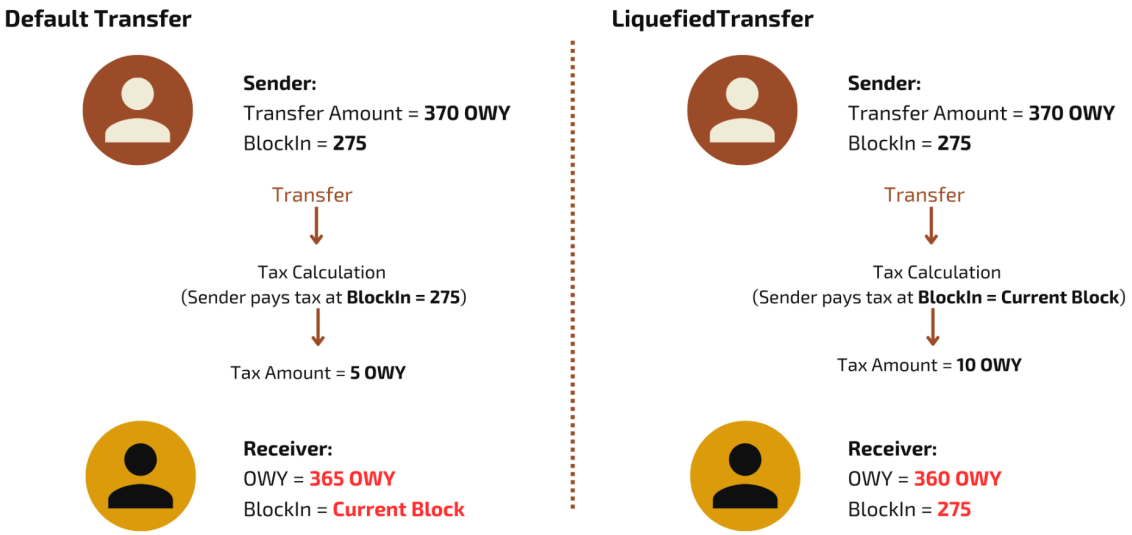

Figure 2. Default vs Liquefied Transfer

Figure 2 visualizes the difference in the recipient's value when the received OWY is liquefied. In a standard transfer, the sender pays tax using the by-time discount stored in their transacting OWY amounts. The amounts are then sent to the recipient with the current block number as $BlockIn$, representing the new stored value. When the recipient wishes to transact these amounts further, they will be required to pay tax with a minimal to zero discount due to less stored time accumulation value.

In the case where the sender liquefies the transfer tokens, the transaction would request the sender to pay tax without their time accumulation discounts stored in those OWY, and the recipient will then receive the OWY tokens with their original stored time value, making their received tokens more liquid for making transactions.

5.2 Tax payment options

We offer two tax payment options to all senders: tax-in-value and tax-out-value. The default setting is tax-in-value, meaning the tax amount is deducted from the sender's transaction value. For example, if person A, who has a balance of 4000 OWY, transfers 370 OWY with a tax of 20 OWY to person B, person B would receive 350 OWY tokens.

Tax-out-value means the tax is charged from an external source, ensuring the receiving amount remains undeducted. The destination account from which the tax will be charged can be specified by the transaction sender. If the sender is responsible for the tax payment, using the same scenario as above, person B would receive the entire 370 OWY, and the tax would be deducted from person A's balance separately. Additionally, the tax can be charged from any external address, provided there is a tax delegation approval from that address. This setup allows multiple addresses to share the same taxpayer account.

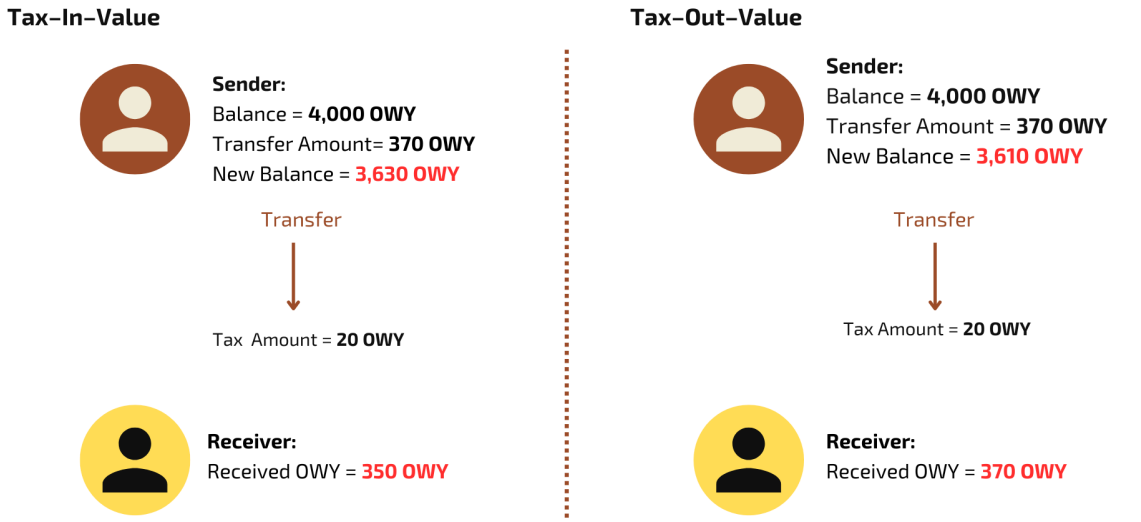

Figure 3. Tax-In-Value and Tax-Out-Value Transfer, where the sender is also the taxpayer.

5.3 Tax slippage limit

Given the high competition in time and tax accumulation within this economy, the degree of privileges from these values may fluctuate across timeframes. To address this, we offer a slippage limit parameter for all senders to limit their transactional tax amount. The option requires the sender to specify the maximum tax amount that they are willing to pay. If the charging amount exceeds this predetermined value, the transaction will be reverted.

5.4 Combination

All three variations of transaction options can be flexibly utilized in tandem, offering a wide range of decision-making possibilities when dealing with OWY transactions. Refer to Figure 4 below for a visual representation.

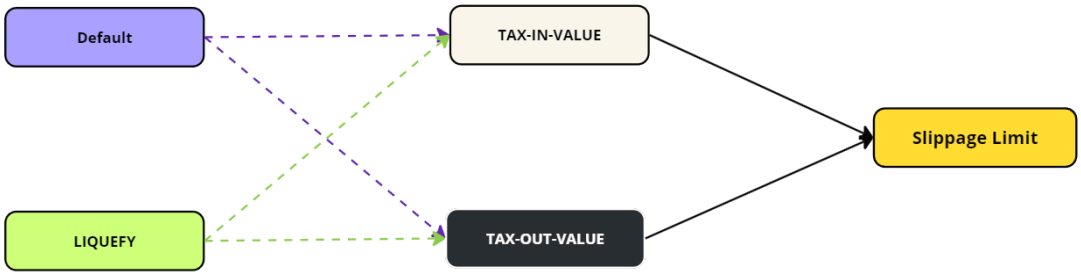

Figure 4. Transaction Configurations

6 Value extraction and insertion

Owy allows the value stored in an individual's OWY tokens to remain independent from others' tokens. Both time and productivity values can be converted into utility tokens, enabling holders to use their value directly without transferring their OWY tokens. Here's an illustration of the OWY accounting architecture:

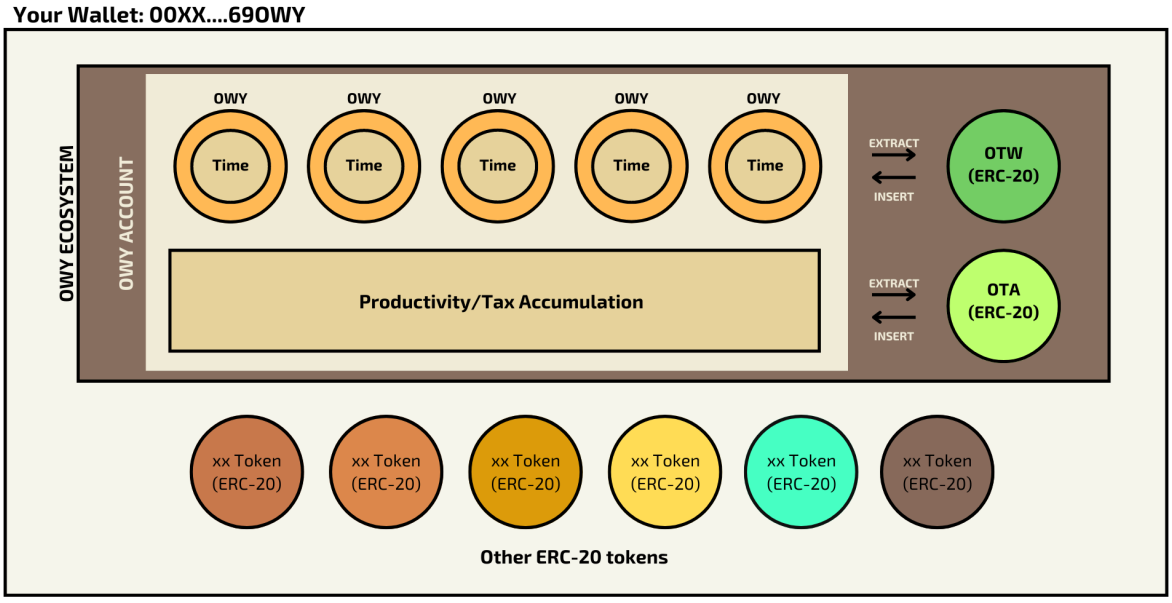

Figure 5. OWY Accounting Architecture

Figure 5 illustrates the components of an individual's OWY account. This account operates similarly to an ERC20 account, holding a number of OWY tokens associated with a specific address. Each account includes a productivity quantity or tax accumulation record, and the time accumulation record is embedded in each OWY token.

Both tax and time accumulation records can be independently extracted from an OWY account as ERC20 tokens. These extracted values, which are not tied to the OWY token or account, can be used freely without incurring tax. Specifically, time accumulation values are converted into Owy Time Weight (OTW) tokens, and tax accumulation values are transformed into Owy Tax Accumulation (OTA) tokens. These tokens can be transferred and traded like regular ERC20 tokens. When an individual extracts value from their OWY account, the account updates accordingly, and the OWY transaction discount is adjusted (decreased) proportionally to the extracted amounts, as illustrated in Figure 6 below.

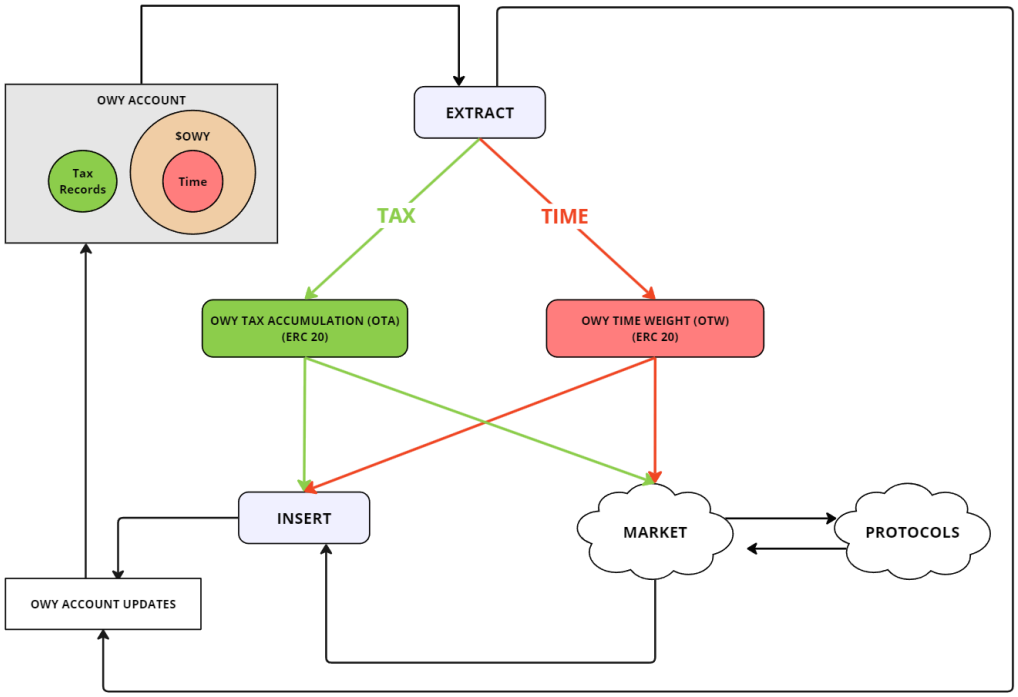

Figure 6. OTW & OTA Extraction and Insertion Flow

Another feature is value insertion. Because ERC20 value tokens can be freely transferred, individuals can acquire them from other people or the market. To use these tokens as a discount on OWY transactions, they must be inserted into the individual's OWY account. Once inserted, the tokens are burnt, and their value is added to the account, enhancing the account's transaction discount.

The quantity of tokens and records to be extracted and inserted each time can be specified, allowing for partial extraction and insertion. Note that once OWY reaches its final supply, these records and tokens will no longer hold any value within the economy, as the taxation system will no longer be operational.

6.1 Owy time weight (OTW): A deflationary utility token for savers

OTW represents time accumulation records. This token follows a deflationary model based on time-volume-weighted calculation, which means that as more OWY are burnt, the total supply of OTW

decreases. OTW tokens are calculated based on an individual's minting capability. They can use the below formula.

$$OTW\ Balance_{Individual} = Owy\ Balance_{Individual} \times (Max\ BlockNumber - BlockIn_{Individual})$$

The $Max\ BlockNumber$ represents the system capacity limit before encountering accounting overflow, hardcoded to the Ethereum block number 118,834,697,888,524,300. This indicates a secondary condition under which the taxation system will cease—when this block is reached. However, this scenario is not practically feasible, even if we assume Ethereum operates at a speed of 1 microsecond per block.

The maximum supply of the token, which dynamically decreases as OWY undergoes supply contraction, can be calculated as follows:

$$OTW\ Total\ Supply \approx Owy\ Total\ Supply \times (Max\ BlockNumber - VWAB)$$

When the tokens are inserted into an OWY account and used for transaction discounts, the utilized portions are entirely removed from the system. The strategies outlined in Section 5 can be employed to effectively manage these resources.

6.2 Owy tax accumulation (OTA): A powerful reusable utility token for taxpayers

OTA represents tax accumulation records. Unlike OTW, OTA is attached to the OWY account rather than the OWY tokens, making it reusable. This allows spenders to borrow OTA from a third-party service (via a flash loan) to decrease their transactional tax. After the transaction is completed, the spender can return the OTA tokens to the service provider, along with a small service fee.

$$OTA\ Balance_{Individual} = TaxAccumulation_{Individual}$$

OTA tokens derive their value from their superior tax discount capability and high scarcity. However, it is important to note that paying less tax results in receiving less tax accumulation. Therefore, the decision to pay or avoid tax depends on individual investment decisions regarding the value of the Owy and OTA tokens. To acquire OTA, individuals can either pay tax to mint new tokens or obtain them from others or the market. The supply characteristic of OTA mirrors those of OWY tokens since new OTAs are minted only when OWY is burned.

$$OTA\ Total\ Supply = Owy\ Max\ Supply - Owy\ Total\ Supply$$

The maximum supply of OTA is 68,999,931 tokens, which represents the difference between the OWY maximum supply and the OWY final supply.

7 Account transfer

To move the entire Owy account to a new wallet address, a user may need to transfer OWY tokens first and then extract tax accumulation records into OTA before transferring them to the new address. Afterward, they would insert the OTA into the new account. This process can be overhead and gas-consuming. Therefore, we offer an option to move the entire OWY account in one step. Note that every time OWY is moved, tax is charged, and Account Transfer is no exception. The Account Transfer feature provides full

transaction options as mentioned in Section 5. This feature requires separate approval to proceed, mitigating the risk of unintended signing.

8 Usage and integration

This section provides a high-level overview of Owy's features, but it may not encompass every aspect of the deployed contracts. For in-depth technical details, please refer to the official documentation.

8.1 ERC-20 full compatibility

To ensure that Owy is easily understood and integrated with minimal adjustment by those familiar with ERC-20 tokens, it retains the core functionalities of standard fee-on-transfer ERC20 tokens. By employing weight averaging, Owy preserves the fundamental ERC-20 characteristics while introducing unique value storage features for each account. Additional features and full customization options are provided as supplementary functions, enhancing the system beyond the standard ERC-20 framework. This design allows OWY to integrate seamlessly with all ERC-20 tokens and existing DeFi protocols.

8.2 Approval types

In the traditional ERC-20 model, there is a single approval function for managing token spending allowances. OWY extends this with four distinct variations to accommodate different purposes and technical needs.

8.3 Transfer types

In the traditional ERC-20 model, token transfers are typically handled by two functions: **`transfer`** and **`transferFrom`**. However, OWY enhances this model by offering six distinct transfer methods.

8.4 EIP-2612 support

Owy also supports smart contract wallets that utilize EIP-2612 for handling transactions [5]. There are three variations of permit functions available, allowing participants to choose the one that best fits their needs.

8.5 On-chain tax calculator

We offer two tax calculation functions to help users estimate their transactional tax before executing a real transaction. These functions allow both retail users and developers to preview potential tax amounts by using either 1. actual on-chain data or 2. custom number inputs.

8.6 OTA and OTW tokens

As previously mentioned, both tokens do not incur any taxes during transfer. They are standard ERC-20 tokens, with their `mint` and `burn` functions connected to OWY accounts. This design allows these tokens to seamlessly integrate with existing DeFi protocols without requiring any adjustments.

9 Token Distribution Methodology

Since the initial supply of OWY is designed to be its maximum, the principle emphasizes the need for a carefully crafted distribution methodology to prevent the centralization of power in OWY acquisition. This token distribution event is called the Initial Liquidity Offering (ILO). Participants contribute their Ethereum or Wrapped Ethereum tokens to a given amount of OWY tokens to participate in liquidity provisioning. The token ratio served by each liquidity provider is dynamic, based on a combination of an ascending ladder pricing model and Dutch auction.

The lower and upper price limits are established to determine the initial market capitalization, and the max available token amount is also set.

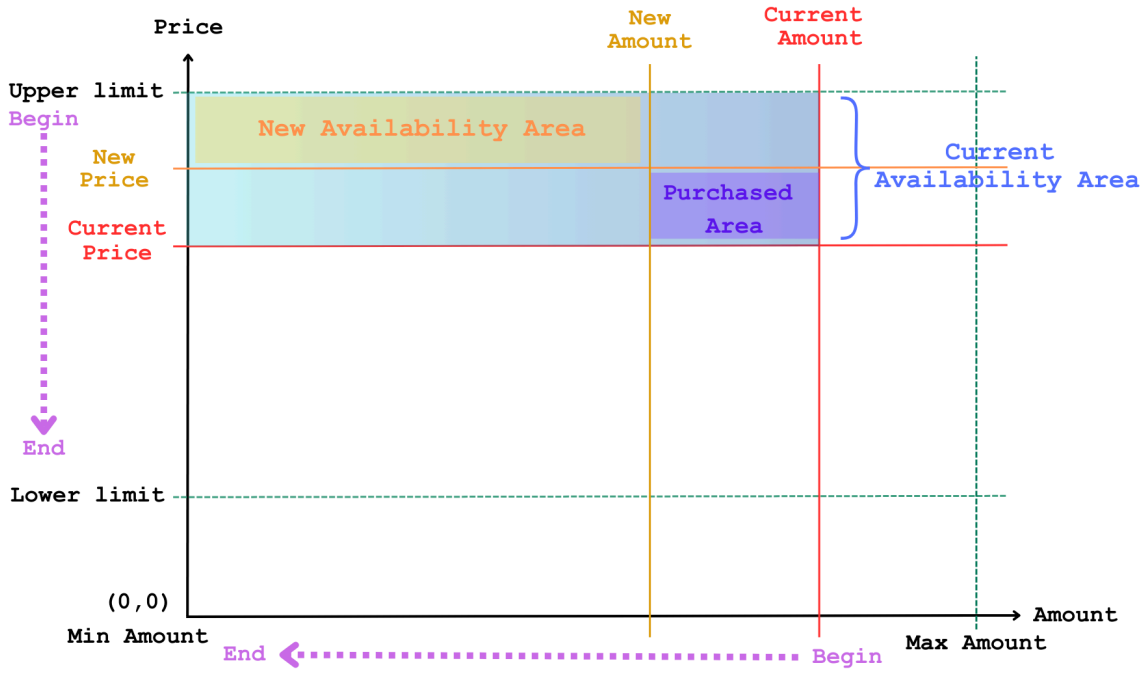

Figure 7. ILO Distribution Diagram

The implementation begins by offering the maximum amount at the upper price limit. As time passes without any purchases, the price gradually falls, similar to a regular Dutch auction. Once a purchase is made, the price stabilizes at the current level. The area where buyers can purchase tokens until the available amount is exhausted is known as the availability area.

The buyer begins purchasing tokens at a price that increases proportionally to the purchase amount relative to the available amount. This means that they buy tokens starting from their entry price up to a final price determined by their purchase amount. The purchased area represents the combination of the amount and price the buyer acquires. The buyer's average purchase price is the midpoint between the final price and the entry price. The final price then becomes the new market price, which replaces the old one (initially set to the max price). The available amount of tokens is updated accordingly. The system then waits for the next purchase, and if no purchase occurs for a sufficient time, the price is algorithmically lowered further from the new price, expanding the availability area vertically.

$$Price_{final} = Price_{entry} + \left[\left(\frac{Amount_{purchase}}{Amount_{available}}\right) \times \left(Price_{max} - Price_{entry}\right)\right]$$

When participating in the ILO, participants receive a receipt token in the form of an ERC-20 token, which allows them to claim their share of the LP token vested for 365 days from the launch date. Claims can be made as often as new blocks are added to the Ethereum blockchain. Upon each claim, only a half of the liquidity tokens are returned to the participant, while the other half is permanently locked in the liquidity pool which no one has permission to access. For participants to achieve profitability, they must consider:

1. The price difference between their entry and exit points, noting that only half of their liquidity tokens are returned.
2. The overall value of their liquidity and the trading fees collected after accounting for impermanent loss.

The taken OWY tokens are not refundable. Once all allocation portions are filled, the ILO ends, and all liquidity will be added to the Uniswap V2 liquidity pool [6]. For more details, please visit the official website.

References

[1] J. G. Hülsmann, *The Ethics of Money Production*. Auburn, AL: Ludwig von Mises Institute, 2008. [Online]. Available: https://mises.org/library/ethics-money-production

[2] L. Chancel and T. Piketty, "Global Income Inequality, 1820–2020: The Persistence and Mutation of Extreme Inequality," *World Inequality Lab, Paris School of Economics, France*, 2020. [Online]. Available: http://www.piketty.pse.ens.fr/files/ChancelPiketty2021JEEA.pdf

[3] S. Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," 2008. [Online]. Available: https://bitcoin.org/bitcoin.pdf

[4] F. Vogelsteller and V. Buterin, "ERC-20 Token Standard," Nov. 2015. [Online]. Available: https://eips.ethereum.org/EIPS/eip-20

[5] M. Lundfall, "ERC-2612: Permit Extension for EIP-20 Signed Approvals," Apr. 2020. [Online]. Available: https://eips.ethereum.org/EIPS/eip-2612

[6] H. Adams, N. Zinsmeister, M. Salem, R. Keefer, and D. Robinson, "Uniswap V2 Core," Mar. 2020. [Online]. Available: https://uniswap.org/whitepaper.pdf

10 Disclaimer

This paper is provided solely for general information purposes and does not constitute, and should not be construed as, investment advice, a recommendation, solicitation, or an invitation to offer or purchase any securities or other financial instruments. The content herein is current opinions of the authors and is not intended to evaluate or guide the merits of any investment decision. Furthermore, it should not be relied upon for accounting, legal**,** tax, or investment advice or recommendations. The information reflected herein does not cover all objectives and technical implementation of the system and is subject to change without being updated. Please refer to the official website and documentation for more data and updates.